CLAIM OR CLAIMS

1. A scavenging system for a gas-powered intermittent engine comprising:

a power piston within a piston cylinder that divides the piston cylinder into a combustion chamber located above the power piston and an air chamber located below the power piston;

a plenum chamber connecting the air chamber to the combustion chamber;

a first check valve located between the air chamber and the plenum chamber supporting a flow of air from the air chamber into the plenum chamber;

a second check valve located between the plenum chamber and the combustion chamber supporting a flow of the air from the plenum chamber into the combustion chamber;

the power piston being moveable in response to an ignition of combustion gas in the combustion chamber between a top position at which a volume of the combustion chamber is minimized and a volume of the air chamber is maximized and a bottom position at which the volume of the combustion chamber is maximized and the volume of the air chamber is minimized;

the first check valve supports the flow of air from the air chamber into the combustion chamber during the downward movement of the power piston toward the bottom position; and

the second check valve supports the flow of air from the plenum chamber into the combustion chamber when the power piston is in the vicinity of the bottom position to initiate a scavenging operation in the combustion chamber as pressure in the plenum chamber exceeds pressure in the combustion chamber.

2. The system of claim 1 in which air is compressed in the air chamber below the power piston during the downward movement of the power piston and this compressed air flows through the first check valve into the plenum chamber.

3. The system of claim 2 in which the compressed air in the plenum chamber begins to flow through the second check valve into the combustion chamber when the power piston arrives the vicinity of the bottom position.

4. The system of claim 3 in which the power piston draws air into the air chamber in response to an upward movement toward the top position of the power piston.

5. The system of claim 4 in which the second check valve is closed when the power piston is located in the vicinity of the top position to ready the combustion chamber for ignition.

6. The system of claim 1 further comprising an exhaust valve that is closed during the downward movement of the power piston and is opened during an upward movement of the power piston toward the top position for exhausting spent combustion gas from the combustion chamber.

7. The system of claim 1 in which the exhaust valve is biased to a closed position for blocking the flow of gas from the combustion chamber.

8. The system of claim 7 further comprising an exhaust valve actuator in fluid communication with the plenum chamber for opening the exhaust valve when a force as a result of pressure within the plenum chamber acting on the exhaust valve actuator exceeds a force as a result of pressure within the combustion chamber acting on the exhaust valve.

9. The system of claim 1 in which the second check valve is biased to a closed position for blocking the flow of air between the plenum chamber and the combustion chamber.

10. The system of claim 1 in which the volume of the air chamber exceeds the volume of the combustion chamber at the start of the power piston's movement in response to the expansion of combustion gases by a ratio of at least 2 to 1.

11. A combustion powered intermittent linear motor comprising:

a combustion chamber and an air chamber within a piston cylinder;

an associated power piston reciprocating in the piston cylinder, the piston powered in a power stroke by ignition of gas in the combustion chamber and arranged to return to rest in a return stroke, when not powered by the ignition of gas;

an exhaust valve associated with the combustion chamber, which valve opens to exhaust spent combustion gases and air from the combustion chamber after combustion;

a plenum chamber being in fluid communication with the air chamber below the piston remote from the combustion chamber, the plenum chamber further being in communication with the combustion chamber, the motor being configured so that:

(a) air is compressed in the air chamber below the power piston during the power stroke and this compressed air flows into the plenum chamber;

(b) then, as the combustion pressure drops, the compressed air from the plenum chamber flows through the combustion chamber, and subsequently through the exhaust valve, scavenging the combustion chamber of spent combustion gases;

(c) as the plenum chamber pressure drops and the piston is on its return stroke, the piston draws in air into the air chamber from below it through an air inlet while exhaust gases in the combustion chamber above the piston are being forced out through the exhaust valve; and

(d) as the pressure in the combustion chamber and the plenum chamber return to substantially atmospheric pressure, the exhaust valve closes in preparation for igniting the combustion chamber,

wherein the compressed air from the plenum chamber enters the combustion chamber near the start of the power piston's return stroke.

12. The motor of claim 11 in which the plenum chamber is in fluid communication with the combustion chamber through a combustion chamber check valve.

13. The motor of claim 12 in which the combustion chamber check valve is biased to a closed position for blocking the flow of air between the plenum chamber and the combustion chamber.

14. The motor of claim 13 in which the exhaust valve is biased to a closed position for blocking flows of gas from the combustion chamber.